

Claims

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1. A drive unit for a fan in a vehicle, comprising a brushless DC electric motor with a rotor and a stator, an electronic actuation system and a housing molded of plastics, said electronic actuation system being surrounded by said housing and said housing supporting said electric motor.

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2. The drive unit according to claim 1, wherein said housing has an integrally molded bearing sleeve for mounting said rotor of said electric motor, said rotor being an external rotor.

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3. The drive unit according to claim 2, wherein said housing is arranged on a suction side of said fan and has air inlet openings for cooling of electronic components of said electronic actuation system and for components of said electric motor.

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4. The drive unit according to claim 3, wherein said external rotor is generally pot-shaped and has an end face attached to a bearing shaft.

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5. The drive unit according to claim 4, wherein said bearing shaft is rotatably mounted in said bearing sleeve by means of bearings placed into said bearing sleeve.

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6. The drive unit according to claim 2, wherein said bearing sleeve is surrounded by a hollow-cylindrical stator of said electric motor.
7. The drive unit according to claim 6, wherein said bearing sleeve has a shoulder on which an inner circumferential edge of said stator bears.

8. The drive unit according to claim 7, wherein said stator is provided with axially projecting connection tags that extend through openings of housing parts surrounding said bearing sleeve and that can be connected to a printed circuit board arranged in an interior of said housing.

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9. The drive unit according to claim 4, wherein said housing has a cylindrical depression surrounding said bearing sleeve and into which extends a circumferential edge of said external rotor.

10. The drive unit according to claim 2, wherein said housing is assembled of two housing parts, with a supporting upper housing part that comprises said bearing sleeve and a lower part that closes an open main side of said upper part.

11. The drive unit according to claim 10, wherein said upper housing part has laterally projecting assembly tabs.

12. The drive unit according to claim 10, wherein said lower housing part and said upper housing part are connected with each other by latching means.

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13. The drive unit according to claim 2, wherein said electronic actuation system has a power part and a control part, which are mounted on separate circuit boards, a circuit board for said power part being made in that a conductor structure stamped out of sheet metal is encapsulated with plastic by means of injection-molding.

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14. The drive unit according to claim 13, wherein said conductor structure has contact tags that project from an edge of said circuit board.

15. The drive unit according to claim 14, wherein said contact tags project from an outside of said housing and are surrounded by at least one plug collar molded with said housing.

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16. The drive unit according to claim 13, wherein said circuit board has connection openings arranged in a circle, said connection tags of said stator being adapted to be inserted into said connection openings, and said conductor structure having terminal parts adjacent to said connection openings.
17. The drive unit according to claim 13, wherein said circuit board has exposed metal surfaces of said conductor structure thermally contacted by power semiconductors of said electronic actuation system.
18. The drive unit according to claim 17, wherein said control part of said electronic actuation system comprises a printed circuit board spaced from and parallel to said circuit board of said power part, said power semiconductors having bent connection tags that extend through openings in said circuit board and are connected to said printed circuit board of said control part.
19. The drive unit according to claim 17, wherein said housing has air inlet openings next to said power semiconductors.
20. The drive unit according to claim 19, wherein said bearing sleeve has a guide channel for cooling air that has entered through said air inlet openings of said housing.
21. The drive unit according to claim 20, wherein said rotor is generally pot-shaped and has air outlet openings on an end face remote from said air inlet openings of said housing.